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| 10/604,748 | 08/14/2003 | Anthony Mantone | 131219MG | 1747 |

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| EXAMINER | |
|---|---|
| FETZNER, TIFFANY A | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2859 | |

DATE MAILED: 01/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/604,748 | MANTONE ET AL. | |
| | Examiner | Art Unit | |
| | Tiffany A Fetzner | 2859 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *11/16/2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 November 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED 2nd Non-final ACTION

### *Oath/Declaration*

1. The oath or declaration is still defective, because contrary to the remarks of the November 16th 2004 response, there was no new signed oath or declaration submitted with the November 16th 2004 response. Additionally the original oath or declaration fails to comply with the proper electronic signature format, therefore the objection to the oath or declaration of the last office was proper, and the requirement for a new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required and maintained. See MPEP §§ 602.01 and 602.02.

The oath or declaration is **still** defective because:
The original oath or declaration was not executed in accordance with either 37 CFR 1.66 or 1.68 because the oath/declaration filed 08/14/2003 does not include a **legible/viewable applicant's signature**, or **a legible/viewable date** of execution.
Additionally a newly submitted oath or declaration with the November 16th 2004 response was never received.

### *Drawings*

2. The objections to the drawings from the August 23rd 2004 office action are **rescinded** in view of the amended drawing corrections submitted November 16th 2004 response which have been approved by the examiner.

3. The Official draftsperson however has objected to the drawings filed November 16th 2004 for formal matters. See the PTO 948 form attached to this action. Corrections to resolve the Official draftsperson's objections are now required.

### *Specification*

4. The objections to the abstract from the August 23rd 2004 office action are **rescinded** in view of the new abstract submitted November 16th 2004 response.

### *Response to Arguments*

5. Applicant's arguments with respect to **claims 1-25** from the November 16th 2004 response have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 1, 2, 15,** and **20-25** are rejected under **35 U.S.C. 102(b)** as being anticipated by **Boemmel et al.**, US patent 6,111,412 issued August 29th 2000, filed May 22nd 1998.

**Damadian et al.**, US patent 6,369,571 issued April 9th 2002, filed May 10th 2001.

8. With respect to **Claim 1**, **Boemmel et al.**, teaches and shows "A gradient coil" assembly where the "x" and "Y" gradient coils of the assembly are 'transverse' (i.e. arranged at 90 degrees / perpendicular / orthogonal) to the direction of the z-gradient coil which is parallel to the main basic magnetic field. [See figure 4, col. 1 lines 13-29; and especially col. 4 line 59 through col. 5 line 15, therefore "transverse gradient coil(s)" are an intrinsic aspect of the **Boemmel et al.**, gradient assembly.] **Boemmel et al.**, also teaches and shows that the gradient coil assembly also comprises "a strip of electrically conductive material; [See the copper cooling conduit of col. 2 lines 52-53; col. 1 line 61 through col. 2 line 6; col. 3 lines 48-63] "and said strip of electrically conductive material having a hollow portion such that fluid is permitted to flow through the conductive material." [See col. 2 lines 53-53; col. 2 lines 24 through col. 3 line 55; col. 4 line 11 col. 5 line 15. In these teachings water, oil or a mixture of water/oil flows through the tubular, cylindrical, or pipe shaped conduit, which may be formed from electrically conductive copper. The examiner notes that tubes, pipes and conduits are necessarily and intrinsically hollow. ]

9. With respect to **Claim 2**, **Boemmel et al.**, teaches and shows " the hollow conductor is wound in a helix" (i.e. a spiral) "to form the general shape of a cylinder." [See col. 3 lines 8-14 figures 2-4] The same reasons for rejection, that apply to **claim 1** also apply to **claim 2** and need not be reiterated.

10. With respect to **Claim 15**, **Boemmel et al.**, teaches and shows "A gradient coil assembly comprising: a strip of conductive material;" [See the copper cooling conduit of col. 2 lines 52-53; col. 1 line 61 through col. 2 line 6; col. 3 lines 48-63] "said strip of conductive material being formed into a cylindrical coil winding;" [See col. 2 line 24

through col. 3 line 55;] "said winding including a continuous tubular hollow area through the winding, said hollow area permitting the continuous flow of coolant." [See col. 2 lines 53-53; col. 2 lines 24 through col. 3 line 55; col. 4 line 11 col. 5 line 15. In these teachings water, oil or a mixture of water/oil flows through the hollow tubular, cylindrical, or pipe shaped conduit, which may be formed from electrically conductive copper. The examiner notes that tubes, pipes and conduits are necessarily and intrinsically hollow and subsequently automatically permit an internal coolant to flow.]

11. With respect to **Claim 20**, **Boemmel et al.**, teaches and shows "A gradient coil" assembly where the "x" and "Y" gradient coils of the assembly are 'transverse' (i.e. arranged at 90 degrees / perpendicular / orthogonal) to the direction of the z-gradient coil which is parallel to the main basic magnetic field. [See figure 4, col. 1 lines 13-29; and especially col. 4 line 59 through col. 5 line 15, therefore "transverse gradient coil(s)" are an intrinsic aspect of the **Boemmel et al.**, gradient assembly.] comprising: a cylindrical inner coil winding" [See figures 2, 3, 4; col. 4 line 59 through col. 5 line 24; col. 1 line 61 through col. 3 line 55], "said winding further including a continuous tubular hollow area through the winding, said tubular area permitting the continuous flow of coolant;" [See col. 2 lines 53-53; col. 2 lines 24 through col. 3 line 55; col. 4 line 11 col. 5 line 15. In these teachings water, oil or a mixture of water/oil flows through the hollow tubular, cylindrical, or pipe shaped conduit, which may be formed from electrically conductive copper. The examiner notes that tubes, pipes and conduits are necessarily and intrinsically hollow and subsequently automatically permit an internal coolant to flow.] "a filler material surrounding the coil winding;" (i.e. insulation col. 2 lines 50-57; col. 3 lines 8-14) "and a plurality of coolant pipes situated in thermal contact with the gradient coil in the filler material." [See col. 2 lines 24 through col. 3 line 55; col. 4 line 11through col. 5 line 37 where the cooling conduit(s) / pipe(s) / tube(s) is/are in good thermal contact with the gradient coil assembly.]

12. With respect to **Claim 21**, **Boemmel et al.**, teaches and shows "a plurality of hollow conductor sections, each permitting fluid to flow through the hollow conductor." [See Figures 1-4; col. 2 line 65 through col. 3 line 22] The same reasons for rejection, that apply to **claim 18** also apply to **claim 21** and need not be reiterated.

13. With respect to **Claim 22**, **Boemmel et al.**, teaches and shows "A method for cooling a gradient coil assembly comprising the steps of: providing a conductor having a continuous hollow center; winding the conductor into a spiral such that said conductor forms a cylinder; providing a cooling system for circulating a coolant through the hollow area in the inner gradient coil." [See col. 2 lines 24 through col. 3 line 55; col. 4 line 11through col. 5 line 37; figures 1 through 4]

14. With respect to **Claim 23**, **Boemmel et al.**, teaches and shows "locating the wound cylindrical conductor in coaxial relationship with other cylindrical windings." [See Figures 1-4, col. 4 line 11 through col. 5 line 37; col. 1 line 62 through col. 3 line 63.] The same reasons for rejection, that apply to **claim 22** also apply to **claim 23** and need not be reiterated.

15. With respect to **Claim 24**, **Boemmel et al.**, shows positioning the "windings in a radially spaced-apart coaxial relationship." [See Figures 2-4, col. 4 line 11 through col. 5 line 37; col. 1 line 62 through col. 3 line 63]. The same reasons for rejection, which apply to claims 22, **23** also apply to **claim 24** and need not be reiterated.

16. With respect to **Claim 25**, **Boemmel et al.**, teaches and shows " the step of circulating coolant through said coil windings." [See col. 2 line 31 through col. 3 line 22; col. 4 lines 11-34.] The same reasons for rejection, that apply to **claims 22, 23**, **24** also apply to **claim 25** and need not be reiterated.

17. **Claims 1** and **15-25** are rejected under **35 U.S.C. 102(b)** as being anticipated by **Doty et al.**, US patent 5,886,548 issued March 23rd 1999, filed February 29th 1996.

18. With respect to **Claim 1**, **Doty et al.**, teaches and shows "A transverse gradient coil assembly" [See col. 3 lines 58-63 where the crescent shaped axially aligned "x" and "Y" gradient coils of the assembly are 'transverse' (i.e. arranged at 90 degrees / perpendicular / orthogonal) to the direction of the z-gradient coil which is parallel to the main basic magnetic field. [See col. 4 lines 9-11; figures 4a, 4b; col. 9 line 49 through col. 11 line 44]. **Doty et al.**, also teaches and shows that the gradient coil assembly also comprises "a strip of electrically conductive material; [See the copper or aluminum strip or tubing of the windings col. 7 19-27] "and said strip of electrically conductive material

having a hollow portion such that fluid is permitted to flow through the conductive material." [See col. 8 line 51 through col. 9 line 37]

19. With respect to **Claim 15**, **Doty et al.**, teaches and shows "A gradient coil assembly comprising: a strip of conductive material;" [See the copper or aluminum strip or tubing of the windings col. 7 19-27] "said strip of conductive material being formed into a cylindrical coil winding;" [See figures 4a, 4b, 5, 6a, 6b, 11a, 11b] "said winding including a continuous tubular hollow area through the winding, said hollow area permitting the continuous flow of coolant." [See figures 4a, 4b, 5, 6a, 6b, 11a, 11b; col. 7 line 12 through col. 9 line 37]

20. With respect to **Claim 16**, **Doty et al.**, teaches that "the hollow conductor is wound for use in a shielded coil" directly. [see col. 3 line 28 through col. 11 line 44 where the shielding of the gradient coils is explained throughout the reference. The same reasons for rejection, that apply to **claim 15** also apply to **claim 16** and need not be reiterated.

21. With respect to **Claim 17 Doty et al.**, teaches and shows "the gradient coil is comprised of a plurality of hollow conductor sections, each permitting fluid to flow through the conductor." [See Figures 2a, 2b, 2c, 4a, 5, 6a, 6b, 11a, 11b; col. 7 line 11 through col. 9 line 37] The same reasons for rejection, which apply to **claims 15 ,16** also apply to **claim 17** and need not be reiterated.

22. With respect to **Claim 18 Doty et al.**, teaches and suggests that additional cooling is provided by a plurality of coolant pipes situated in thermal contact around the coil" windings. [See figure 5 which show at least 2 cooling pipes, and figure 6b which shows the cooling jacket for the flowing water; col. 7 line 11 through col. 11 line 44] col. 28 lines 27 to 53 where the additional fluid cooling device, (i.e. the additional pipes) are interpreted as suggesting additional coolant piping means beyond the cooling conduits taught in the reference.] The same reasons for rejection, that apply to **claims 15,16, 17** also apply to **claim 18** and need not be reiterated.

23. With respect to **Claim 19 Doty et al.**, teaches that "the coolant passed through the tubular area is water, ethylene glycol or a mixture of the two coolants." [See col. 8

line 49 through col. 9 line 14.] The same reasons for rejection, that apply to **claims 15, 16, 17, 18** also apply to **claim 19** and need not be reiterated.

24. With respect to **Claim 20**, **Doty et al.**, teaches and shows "A transverse gradient coil assembly" [See col. 3 lines 58-63 where the crescent shaped axially aligned "x" and "Y" gradient coils of the assembly are 'transverse' (i.e. arranged at 90 degrees / perpendicular / orthogonal) to the direction of the z-gradient coil which is parallel to the main basic magnetic field. [See col. 4 lines 9-11; figures 4a, 4b; col. 9 line 49 through col. 11 line 44]. **Doty et al.**, also teaches and shows that the gradient coil assembly also comprises "a cylindrical inner coil winding" [See figures 4a, 4b, 5, 6a, 6b, 11a, 11b] "said winding further including a continuous tubular hollow area through the winding, said tubular area permitting the continuous flow of coolant;" [See figures 4a, 4b, 5, 6a, 6b, 11a, 11b; col. 7 line 12 through col. 9 line 37] Additionally, **Doty et al.**, teaches "a filler material surrounding the coil winding;" (i.e. lead) [See col. 3 lines 58-67; col. 7 line 12 through col. 9 line 37] "and a plurality of coolant pipes situated in thermal contact with the gradient coil in the filler material." [See figures 5, 6b, component 504; col. 7 line 12 through col. 11 line 44 where the cooling pipe(s) / tube(s) is/are in good thermal contact with the gradient coil assembly.]

25. With respect to **Claim 21**, **Doty et al.**, teaches and shows "a plurality of hollow conductor sections, each permitting fluid to flow through the hollow conductor." [See figures 4a, 4b, 5, 6a, 6b, 11a, 11b; col. 7 line 12 through col. 9 line 37] The same reasons for rejection, that apply to **claim 18** also apply to **claim 21** and need not be reiterated.

26. With respect to **Claim 22**, **Doty et al.**, teaches and shows "A method for cooling a gradient coil assembly comprising the steps of: providing a conductor having a continuous hollow center; winding the conductor into a spiral such that said conductor forms a cylinder; providing a cooling system for circulating a coolant through the hollow area in the inner gradient coil." [See col. 7 line 12 through col. 11 line 44 figures 2a, 2b, 2c, 4a, 5, 6a, 6b, 11a, 11b]

27. With respect to **Claim 23**, **Doty et al.**, teaches and shows "locating the wound cylindrical conductor in coaxial relationship with other cylindrical windings." [See col. 3

lines 58-63 Figures 1, 2a, 2b, 2c, 4a, 5b, 5, 6a, 6b, 9, 11a, 11b] The same reasons for rejection, that apply to **claim 22** also apply to **claim 23** and need not be reiterated.

28. With respect to **Claim 24**, **Doty et al.**, shows positioning the "windings in a radially spaced-apart coaxial relationship." [See col. 3 lines 58-63 Figures 1, 2a, 2b, 2c, 4a, 5b, 5, 6a, 6b, 9, 11a, 11b col. 7 line 12 through col. 11 line 44] The same reasons for rejection, which apply to claims 22, **23** also apply to **claim 24** and need not be reiterated.

29. With respect to **Claim 25**, **Doty et al.**, teaches and shows " the step of circulating coolant through said coil windings." [See figures 5, 6b, col. 7 line 12 through col. 9 line 37.] The same reasons for rejection, that apply to **claims 22, 23, 24** also apply to **claim 25** and need not be reiterated.

***Claim Rejections - 35 USC § 103***

30. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

31. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

32. **Claims 3-7,** and **16-19** are rejected under **35 U.S.C. 103(a)** as being unpatentable over **Boemmel et al.**, US patent 6,111,412 issued August 29th 2000, filed May 22nd 1998.

33. **Claims 8-14** are rejected under **35 U.S.C. 103(a)** as being unpatentable over **Boemmel et al.**, US patent 6,111,412 issued August 29th 2000, filed May 22nd 1998; in further view of **Damadian et al.**, US patent 6,369,571 issued April 9th 2002, filed May 10th 2001.

34. With respect to **Claim 8 Boemmel et al.**, teaches and shows "An" NMR / MRI tomography "apparatus comprising: "a magnetic resonance" tomography "imaging system" [See col. 1 lines 6-37] "having a plurality of gradient coils positioned about a bore of a magnet to impress a polarizing magnetic field" [See col. 1 lines 6-37] **Boemmel et al.**, also teaches and shows a gradient coil is wound of a hollow conductor element such that fluid is permitted to flow through the conductor." [See col. 2 lines 53-53; col. 2 lines 24 through col. 3 line 55; col. 4 line 11 col. 5 line 15. In these teachings water, oil or a mixture of water/oil flows through the wound hollow tubular, cylindrical, or pipe shaped conduit(s), which may be formed from electrically conductive copper. The examiner notes that tubes, pipes and conduits are necessarily and intrinsically hollow and subsequently automatically permit an internal coolant to flow.]

35. **Boemmel et al.**, lacks directly teaching or showing that "an RF transceiver system and an RF switch controlled by a pulse mode to transmit RF signals to an RF coil assembly to acquire MR images;" and "an input device to select a scan sequence"; However, **Damadian et al.**, teaches and shows "An MRI apparatus comprising: a magnetic resonance imaging system (MRI)" [See figure 2] "having a plurality of gradient coils positioned about a bore of a magnet to impress a polarizing magnetic field" [See components 45 in figure 2; figures 17A through 17E col. 8 lines 47-56] "and an RF transceiver system and an RF switch controlled by a pulse mode to transmit RF signals to an RF coil assembly to acquire MR images;" [See col. 10 lines 15-30] "an input device to select a scan sequence";(i.e. the computer control) [See col. 10 lines 15-30]

36. It would have been obvious to one of ordinary skill in the art at the time that the invention was made that the gradient assembly of **Boemmel et al.**, which shows a flat gradient coil assembly in figure 2, could be utilized as the gradient coil assembly component 45 of / within the **Damadian et al.**, MRI system shown in figure 2, because the **Boemmel et al.**, invention is directed toward the gradient assembly itself, that is used in combination with conventional MRI / NMR components. The gradient assembly shown by **Damadian et al.**, in figure 2 via component 45 is a flat open architecture gradient coil assembly, the ability to modify and combine the **Damadian et al.**, reference with the earlier flat gradient coil assembly of **Boemmel et al.**, by switching

gradient assembly component 45 of **Damadian et al.**, with the gradient coil assembly of **Boemmel et al.**, for the functional purpose of maintaining a more efficient consistent cooling the gradient coil assembly would have been readily obvious to one of ordinary skill in the art at the time that the invention was made.

37. With respect to **Claim 9**, **Boemmel et al.**, teaches that " the hollow conductor is wound to comprise a transverse coil." [See the rejection of claim 1 and col. 4 lines 59 through col. 5 line 15] The same reasons for rejection, that apply to **claim 8** also apply to **claim 9** and need not be reiterated.

38. With respect to **Claim 3**, and **corresponding claims 10** and **16** which depend respectively from **claims 1, 8,** and **15**; **Boemmel et al.**, lacks directly teaching that "the hollow conductor is wound for use in a shielded coil" directly. However, **Boemmel et al.**, teaches that shielded gradient coil assemblies are known in the art. [See col. 1 lines 13-37] that the thickness of the cooling conduit(s) are based upon the desired electrical insulation [See col. 3 lines 8-14] and that the flowing cooling fluid through the hollow windings helps dissipate heat produced when the windings are active, [See col. 1 line 62 through col. 3 line 55; col. 4 lines 11-47] Therefore it would have been obvious to one of ordinary skill in the art at the time that the invention was made that the wound hollow conductor windings which comprise the **Boemmel et al.**, coil system [See figures 2-4] provide, or are used as, a shielded coil system. [See col. col. 1 line 62 through col. 3 line 55; col. 4 lines 11-47] The same reasons for rejection, that apply to **claims 1, 2, 8, 9,** and **15** also apply to **claim 3** and need not be reiterated.

39. With respect to **Claim 4**, and **corresponding claims 11** and **17** which depend respectively from **claims 1, 8,** and **15**; **Boemmel et al.**, teaches and shows "the gradient coil is comprised of a plurality of hollow conductor sections, each permitting fluid to flow through the conductor." [See Figures 1-4;; col. 3 lines 8-22; col. 4 lines 11 through col. 5 line 37] The same reasons for rejection, that apply to **claims 1, 2, 3, 8, 10, 15 ,16** and the reasons for obviousness, that apply to **claims 3, 10**, and **16** also apply to **claims 4, 11,** and **17** and need not be reiterated.

40. With respect to **Claim 5**, and **corresponding claim 12** which depend respectively from **claims 1,** and **8**; **Boemmel et al.**, shows that "the hollow conductor is

wound for use in a flat gradient coil, [See figure 2; col. 2 lines 24-49] Therefore, It would have been obvious to one of ordinary skill in the art at the time that the invention was made that the gradient coil assembly of **Boemmel et al.**, can be utilized "in an open architecture Magnetic Resonance Imaging device", because in open architecture MRI devices the gradient coils are traditionally flat / planar / pancaked on opposite sides of a patient examination zone, without enclosing the patient in order to give the patient a sense of "openness" and to diminish any claustrophobic fears of a patient. Therefore a flat gradient coil assembly would have been readily identifiable by one of ordinary skill in the art for use in "open" MRI / NMR imaging systems. The same reasons for rejection, that apply to **claims 1, 2, 3, 4, 8, 10, 11, 15 ,16, 17** and the reasons for obviousness, that apply to **claims 3, 10**, and **16** also apply to **claims 5,** and **12** and need not be reiterated.

41. With respect to **Claim 6**, and **corresponding claims 13** and **18** which depend respectively from **claims 1, 8,** and **15**; **Boemmel et al.**, teaches and suggests that additional cooling is provided by a plurality of coolant pipes situated in thermal contact around the coil" windings. [See col. 2 line 24 through col. 3 line 63 col. 4 lines 11-47.] The same reasons for rejection, that apply to **claims 1, 2, 3, 4, 5, 8, 10, 11, 12, 15 ,16, 17** and the reasons for obviousness, that apply to **claims 3, 10**, and **16** also apply to **claims 6, 13,** and **18** and need not be reiterated.

42. With respect to **Claim 7**, and **corresponding claims 14** and **19**, which depend respectively from **claims 1, 8,** and **15**; **Boemmel et al.**, teaches that "the coolant passed through the tubular area is water, ethylene glycol or a mixture of the two coolants." [See col. 2 lines 31-34, and col. 4 lines 30-34; the examiner considers ethylene glycol to be a type of oil / an oil derived mixture since ethylene is an oil, and the reference teaches using water, oil, and / or a water/oil mixture as a coolant.] The same reasons for rejection, that apply to **claims 1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 13, 15 ,16, 17, 18** and the reasons for obviousness, that apply to **claims 3, 10**, and **16** also apply to **claims 7, 14,** and **19** and need not be reiterated.

**Prior art of Record**

43. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Asterisk denotes art noted as per this office action.

**A)** ***Doty et al.,** US patent 5,554,929 issued September 10th 1996, filed March 12th 199. which is the corresponding parent case of which **Doty et al.,** US patent 5,886,548 issued March 23rd 1999 is a divisional.

**B)** **Heid** US patent application publication 2003/0218460 A1 published November 27th 2003, with an effective US filing date of April 11th 2003.

**C)** **Vavrek et al.,** US patent 5,304,933 issued April 19th 1994.

**D)** **Damadian et al.,** US patent 6,445,186 B1 issued September 3rd 2002; filed May 10th 2001.

**E)** **Damadian et al.,** US patent 6,469,508 B1 issued October 22nd 2002; filed May 10th 2001.

**F)** **Damadian et al.,** US patent 6,496,007 B1 issued December 17th 2002; filed May 10th 2001.

**G)** **Damadian et al.,** US patent 6,335,623 B1 issued January 1st 2002; filed November 25th 1998.

**H)** **Wollin** US patent 6,452,390 B1 issued September 17th 2002, filed November 15th 2000.

**I)** **Herd et al.,** US patent 5,774,032 issued June 30th 1998.

**J)** **Lew** US patent 4,901,018 issued February 13th 1990.

**K)** **Marshall** US patent 3,412,320 issued November 19th 1968.

**L)** ***Arz et al.,** US patent 6,741,152 B1 issued May 25th 2004, filed September 2nd 1999. [See entire reference]

**M)** ***Arz et al.,** GB patent 2 342 986 A published 26 April 2000; which corresponds to ***Arz et al.,** US patent 6,741,152 B1 issued May 25th 2004, filed September 2nd 1999.

**N)** ***Arz et al.,** DE patent 198 39 987 A1 published March 9th 2000 which corresponds to ***Arz et al.,** US patent 6,741,152 B1 issued May 25th 2004, filed September 2nd 1999.

**O)** ***Heid** US patent application publication 2001/0033168 A1 published October 25th 2001, with an effective US filing date of April 23rd 2001. [See figures 2 and 3; paragraphs [0002] through [0027] ]

**P)** ***Morich et al.**, US patent 5,424,643 issued June 13th 1995.

**Conclusion**

44. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

45. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(703) 872-9306**.

Tiffany A. Fetzner
TAF
January 26, 2005

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BRIJ SHRIVASTAV
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